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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/042,666 03/17/98 GALVANAUSKAS A A7139

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EXAMINER

LEE, J

ART UNIT

PAPER NUMBER

2874

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/042,666

Applicant

Almantas Galvanauskas et al.

Examiner

John D. Lee

Group Art Unit

2874

☐ Responsive to communication(s) filed on _____.☐ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire THREE (3) month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims☒ Claim(s) 1-28 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 14-19 and 22-26 is/are allowed.☒ Claim(s) 1-13, 20, 21, 27, and 28 is/are rejected.☐ Claim(s) _____ is/are objected to.☐ Claims _____ are subject to restriction or election requirement.**Application Papers**☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.☐ The drawing(s) filed on _____ is/are objected to by the Examiner.☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.☐ The specification is objected to by the Examiner.☐ The oath or declaration is objected to by the Examiner.**Priority under 35 U.S.C. § 119**☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been☐ received.☐ received in Application No. (Series Code/Serial Number) _____.☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).**Attachment(s)**☒ Notice of References Cited, PTO-892☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____☐ Interview Summary, PTO-413☒ Notice of Draftsperson's Patent Drawing Review, PTO-948☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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This application has been filed with twelve (12) sheets of drawing which have been objected to by the Office Draftsperson (see attached form PTO-948) but which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20, 21, 27, and 28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Each of these four claims begins with the phrase "The ultrashort pulse generator according to claim....". In order to have correct antecedent agreement, however, the term "ultrashort pulse generator" should be --combination--. Because of this antecedent problem, the claims are presently indefinite. It is believed that claim 21 is intended to depend upon 20 rather than upon claim 14, since there is no antecedent support for the term "said mode-locked fiber laser". It is also believed that claim 28 is intended to depend upon 27 rather than upon claim 22, since there is no antecedent support for the term "said mode-locked fiber laser".

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,815,307 to Arbore et al. Arbore et al discloses an ultrashort pulse generator comprising an ultrashort optical pulse source and a wavelength conversion apparatus 10 for adjusting the chirp of the ultrashort optical pulse and converting the wavelength thereof (for example, to a second harmonic wavelength of the ultrashort optical pulse wavelength). The conversion apparatus 10 is a grating based device. Although not stated in the reference, such devices are well known in the art to include optical fiber gratings, so that the apparatus 10 could obviously be fabricated in an optical waveguide. The apparatus 10 of Arbore et al is also clearly an optical parametric device, operating on optical nonlinear principles to convert the wavelength of the ultrashort optical pulse therein. The second harmonic generation portion of the Arbore et al wavelength conversion apparatus constitutes a "mode converter" (as recited in applicant's claims 2 and 4). The use of adiabatically tapered input waveguides for ease of light insertion into other optical waveguides is well known in the art. The use of such an adiabatically tapered input waveguide in Arbore et al would thus have been obvious to the person of ordinary skill in the art. Note that the nonlinear material for wavelength conversion apparatus 10 can be a periodically-poled ferroelectric material such as KTP and isomorphs of KTP (column 6, lines 44-60, of Arbore et al). The specific ultrashort optical pulse source used in the reference is not identified, but the general discussion (see the paragraph bridging columns 6 and 7) indicates that a known ultrafast laser should be employed. This obviously implies that lasers such as those identified in applicant's claims 8-10 should be used, and the use of any of them would thus have been obvious to the person of ordinary skill.

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Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,815,307 to Arbore et al as applied to claim 1 above, and further in view of U.S. Patent 5,321,707 to Huber. The only difference between the Arbore et al device and that of applicant's claim 12 is that there is no amplifier upstream of the wavelength conversion apparatus 10 for amplifying the ultrashort pulses prior to conversion to a different (e.g. a harmonic) wavelength. The use of upstream and downstream amplifiers, such as rare earth doped optical fiber amplifiers, however, has been known in the art for a long time. Note, for example, the Huber reference, which shows a rare earth doped optical fiber amplifier 64 downstream of the active elements in a pumped active optical device. The person of ordinary skill in the art would have recognized that any optical signal that has been newly generated or converted will experience a loss in intensity as it travels along, thus necessitating the use of in-line amplifiers like that of Huber. It would thus have been obvious to use an upstream amplifier like the rare earth doped optical fiber amplifier 64 of Huber in the Arbore et al pulse generation device, providing the necessary amplification for the wavelength conversion apparatus 10. Regarding applicant's claim 13, the rare earth doped optical fiber amplifier of Huber includes erbium doped optical fiber amplifiers.

Claims 14-19 and 22-26 are allowed. The prior art of record does not disclose or suggest the combination of a color image generating device and an ultrashort pulse generator for supplying image data in the form of red, green, and blue ultrashort optical pulses, the ultrashort pulse generator including a plurality of wavelength conversion channels, each channel for converting a wavelength of the ultrashort optical pulses to a different wavelength and comprising an optical parametric generation portion therein. The prior art of record also does not disclose or suggest the combination

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of a color image generating device and an ultrashort pulse generator for supplying image data in the form of red, green, and blue ultrashort optical pulses, the ultrashort pulse generator including a multi-sectioned optical waveguide having the details set forth in claim 22.

For the same reasons, claims 20, 21, 27, and 28 would be allowable if rewritten or amended to overcome the rejection under 35 U.S.C. § 112, second paragraph, set forth above.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. A variety of prior art ultrashort optical pulse generators can be seen in the cited U.S. Patents to Blow et al (4,853,933), Taylor et al (4,958,910), and Stock et al (5,862,287). U.S. Patent 5,557,699 to Kester et al describes an optical waveguide switching arrangement for ultrashort optical pulses which generates a pulsed output second harmonic optical beam. Wavelength conversion devices which output wavelength converted optical radiation into a plurality of optical waveguide channels can be seen in the cited U.S. Patents to Jain et al (4,784,450) and Risk (5,224,193).


It is recognized that this application is a Continuation-In-Part of copending application Serial Number 08/975,679, filed on November 21, 1997. The parent application is presently unavailable to the Examiner, but the potential issue of double patenting between the claims of the two applications will be thoroughly analyzed at the time of the next Office action. Such analysis may affect the determination of claim allowability set forth in this Office action.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR § 1.56 to point out the inventor and

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invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. §§ 102(f) or (g) prior art under 35 U.S.C. § 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (703) 308-4886. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956 or to the technical support staff supervisor at telephone number (703) 308-4854.


John D. Lee
Primary Patent Examiner
Group Art Unit 2874